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## The Results of Pathological-Anatomical and Histological Studies in Experimental Tuberculosis with the Use of the Drug "Rifizostrept"

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**Abstract:** The article presents the results of pathological and histological studies on the study of the anti-tuberculosis activity of the complex drug "Rifizostrept", developed by scientists of the laboratory for the study of tuberculosis UzSRIV, with experimental tuberculosis in guinea pigs, the indicators for testing the bactericidal effectiveness of this complex against mycobacterium are highlighted.

**Keywords:** tuberculosis, mycobacteria, guinea pigs, bactericidal efficacy, "Rifizostrept" complex, pathological changes, microscopy, histological sections.

**Relevance of the topic.** Over the years since our republic gained independence in the field of veterinary science and practice, large-scale measures have been taken to combat tuberculosis, which is of social importance among people and animals. As a result, a certain stability was achieved regarding the epizootic status of this disease. However, the migration of mycobacteria between different species of animals and birds, as well as into the human body and the latent form of the disease can lead to a complication of the epidemic and epizootic situation of tuberculosis in our country. Therefore, one of the urgent tasks is the creation and improvement of effective special chemicals that are important in the recovery of livestock from tuberculosis epizootics in our republic, and the creation of a complex of new tuberculostatics against resistant strains of mycobacteria from local raw materials.

**Materials and research methods.** To solve this problem, an experiment was conducted on guinea pigs in the tuberculosis research laboratory of the Research Institute of Veterinary Medicine. In the experiment, we studied the effectiveness of a new tuberculostatic complex - the drug "Rifizostrept" in a living organism, that is, a special bactericidal activity against mycobacteria. For this, 12 healthy guinea pigs were used that did not respond to PPD-tuberculin diagnostics in allergic tests.

Initially, all experimental animals were infected with Mycobacterium tuberculosis subcutaneously at a dose of 0.03 mg/kg and divided into two groups as follows:

24 days later (the incubation period of the disease) after infection with M.bovis-8-03, the animals of the 1st experimental group (9 animals) were injected subcutaneously with the drug "Rifizostrept" at a dose of 10 mg/kg every 5 days until the end of the experiment;

Animals of the 2nd control group (3 heads) after infection with M.bovis-8-03 strain, the drug was not administered.

All research works in the manual of the experiment "Laboratory diagnosis of tuberculosis", "Diagnosis of tuberculosis in animals" (Tashkent, 2011), T.N. Yashchenko, I.S. Mechev "Guidelines for laboratory research in tuberculosis" (M. Medicine, 1973) instruction and G.A. Merkulov was performed in full compliance with the rules of asepsis and antisepsis on the basis of the teaching aids "Course of Pathological and Histological Techniques" (M. Medgiz, 1976).

After the end of the experiment, that is, 90 days after infection with Mycobacterium tuberculosis, guinea pigs of both groups were slaughtered and examined for histopathological examination. They also took biomaterial for bacteriological examination. In addition, pathological samples 0.2-0.5 cm thick were taken from the internal organs of laboratory animals (lungs, heart, liver, kidneys, spleen and lymph nodes) for further pathomorphological and histochemical studies. For curing (fixation) of these samples, fixing solutions were used: 12% formalin, 96% ethyl alcohol, Muller's liquid, Carnoy's liquid, a mixture of alcohol and formalin.

**Research results.** After the killing of guinea pigs during tests for the bactericidal activity of the tuberculostatic complex - the drug "Rifizostrept", a complete pathoanatomical study was carried out and the following was established.

After the tuberculosis strain M.bovis-8-03, the guinea pigs of the first experimental group, which received Rifizostrept, were opened and pathoanatomically examined, no pathological processes characteristic of tuberculosis were detected. In each of the laboratory animals, under the skin of the thigh at the site of injection of mycobacteria, foci the size of mung bean, enclosed in a connective tissue capsule, were detected. On a transverse section, a white-yellow substance without pus grows inside these foci. The lungs are light red in color, the structure is well preserved. In places, several white foci surrounded by a capsule the size of alfalfa seeds, on the transverse section of which pus was not found. The size of the spleen is slightly enlarged, red-brown in color, several necrotic foci are visible on the surface without encapsulation of pus, no changes are observed in the transverse section. Similarly, no pathological anatomical changes were found in the heart, liver and kidneys.

Pathological anatomical examination of guinea pigs of the second control group, infected with pathogens and not receiving a combination of tuberculostatic drugs "Rifizostrept", revealed tuberculosis-specific changes, and some animals even developed a generalized form of the disease.

In particular, under the skin of the thighs at the site of infection with mycobacteria, encapsulated foci 2-3 cm in size were formed, in which a whitish-yellow caseous substance accumulated.

The lungs are enlarged and edematous, numerous white-yellow tuberculous foci are developed on the surface and in the inner layers of the cross section, surrounded by granulation tissue of various sizes (up to 0.3 cm), it was found that a white-gray substance formed on the cross section.

The liver is enlarged, its parenchyma is swollen, the structure of its surface and internal parts is disturbed by numerous different-sized caseous-encapsulated foci of necrosis.

The size of the spleen also increased, the structure is hard and dense, the edges are opaque. In some guinea pigs, follicles in the structure of the spleen, enlarged up to 7-8 times, are hardly noticeable. In some parts of its parenchyma, the structure of the spleen is almost invisible due to the fact that a large number of tuberculous foci of caseous substance of different sizes grow together.

The development of similar pathoanatomical changes was also found in other internal organs of laboratory animals in the control group.

Pathological samples obtained from the internal organs of guinea pigs of both groups, after fixation, were subjected to histological processing and embedded in paraffin. Histological sections were prepared from frozen sections on a microtome and stained with hematoxylin-eosin. Histosections were examined under a microscope and revealed the following.

The lung tissue of guinea pigs of the first experimental group, infected with the M.bovis 8-03 strain and treated with Rifizostrept, was formed in the form of a large number of round or oval alveolar vesicles. Inside the capillaries between them are the formed elements of blood. The thin walls of the alveoli are covered from the inside by a single layer of squamous epithelial cells. In addition, connective tissue elements and cells are also visible between the alveoli.

On histological sections prepared from the hearts of laboratory animals of this group, the myocardium is expressed as a strong layer of muscle tissue, consisting of transverse strands. The boundaries and nuclei of cardiomyocytes are clearly visible, and in some places there are capillaries between them. Intermuscular connective tissue is fibrous and contains a large number of blood capillaries.

A histological section of the liver shows numerous hepatic lobes. Although their boundaries are not clearly defined, the parenchyma of the lobe can be identified by the central vein located in it. Around the midrib there are a large number of brown granules of hemosiderin pigment. The liver plates consist of one or two layers of hepatocytes. Liver cells usually have a polygonal shape, the cytoplasm is pale red-pink, in the center there is a large oval nucleus. In the liver parenchyma, or lobules, the structure of hepatocytes is almost the same, and no changes similar to dystrophic processes were found in them.

The sheath part of the kidneys is presented on histosections consisting of renal bodies and the proximal and distal parts of the nephrons, which passes into the brain without clear boundaries. The proximal tubules are composed of single-layered cuboidal cells, the nuclei of which are mostly round, and the cytoplasm is stained pink-light red. The distal tubules are wider, and in the cytoplasm of nephrocytes of some laboratory animals one can see granules of a yellow-brown pigment - lipofuscin. The descending nephrons in the renal medulla are composed of a single-layered squamous epithelium, while the ascending portion is composed of cuboidal epithelium. Between the nephrons is loose thinned connective tissue and a large number of blood capillaries.

On histosections of the spleen, the parenchyma of the organ is expressed as white and red pulp. Lymphoid follicles in the white pulp consist of clusters of circular lymphocytes, and the thick wall of the central artery in them consists of smooth muscle cells. Some lymph follicles have little visible connective tissue. The red pulp is observed in the form of a large amount of blood, mainly veins. The blood vessels are dilated, there are formed elements of the blood, consisting of a larger number of erythrocytes.

Thus, based on the results of the above pathomorphological studies, it can be said that minor structural changes occur in the internal organs of the guinea pigs of the first experimental group.

Taking into account that pathoanatomical changes in the body of laboratory animals of the second control group, which were infected with pathogens and did not use a new combination of tuberculostatic drugs - "Rifizostrept", are very typical for tuberculosis disease, and in connection with a detailed study of the pathological and histological processes developing in the internal organs, we did not consider it necessary to describe in detail the results of our morphological studies.

**Conclusion.** Based on the data of the above pathoanatomical and histomorphological studies of an intravital experiment conducted on laboratory animals, it can be concluded that a new combination of

tuberculostatics - the drug "Rifizostrept" - is an effective remedy against mycobacteria, has an active bactericidal effect against pathogens in the body of guinea pigs. In this regard, it is advisable to continue studying the effectiveness of this drug against tuberculosis of farm animals and birds in this direction.

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